

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
23 February 2006 (23.02.2006)

(10) International Publication Number  
**WO 2006/019180 A1**

(51) International Patent Classification<sup>7</sup>: HOIL 33/00, 21/301

(21) International Application Number:  
PCT/JP2005/015308

(22) International Filing Date: 17 August 2005 (17.08.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
2004-240764 20 August 2004 (20.08.2004) JP  
60/605,500 31 August 2004 (31.08.2004) US

(71) Applicant (for all designated States except US): **SHOWA DENKO K.K.** [JP/JP]; 13-9, Shiba Daimon 1-chome, Minato-ku, Tokyo 105-8518 (JP).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **YAKUSHIJI, Koji**, [JP/JP]; c/o SHOWA DENKO K.K., 5-1, Yamata Kaigan dori, Ichihara shi, Chiba, 290-0067 (JP).

(74) Agents: **FUKUDA, Kenzo** et al.; Kashiwaya Bldg., 6-13, Nishishinbashi 1-chome, Minato-ku, Tokyo 105-0003 (JP).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

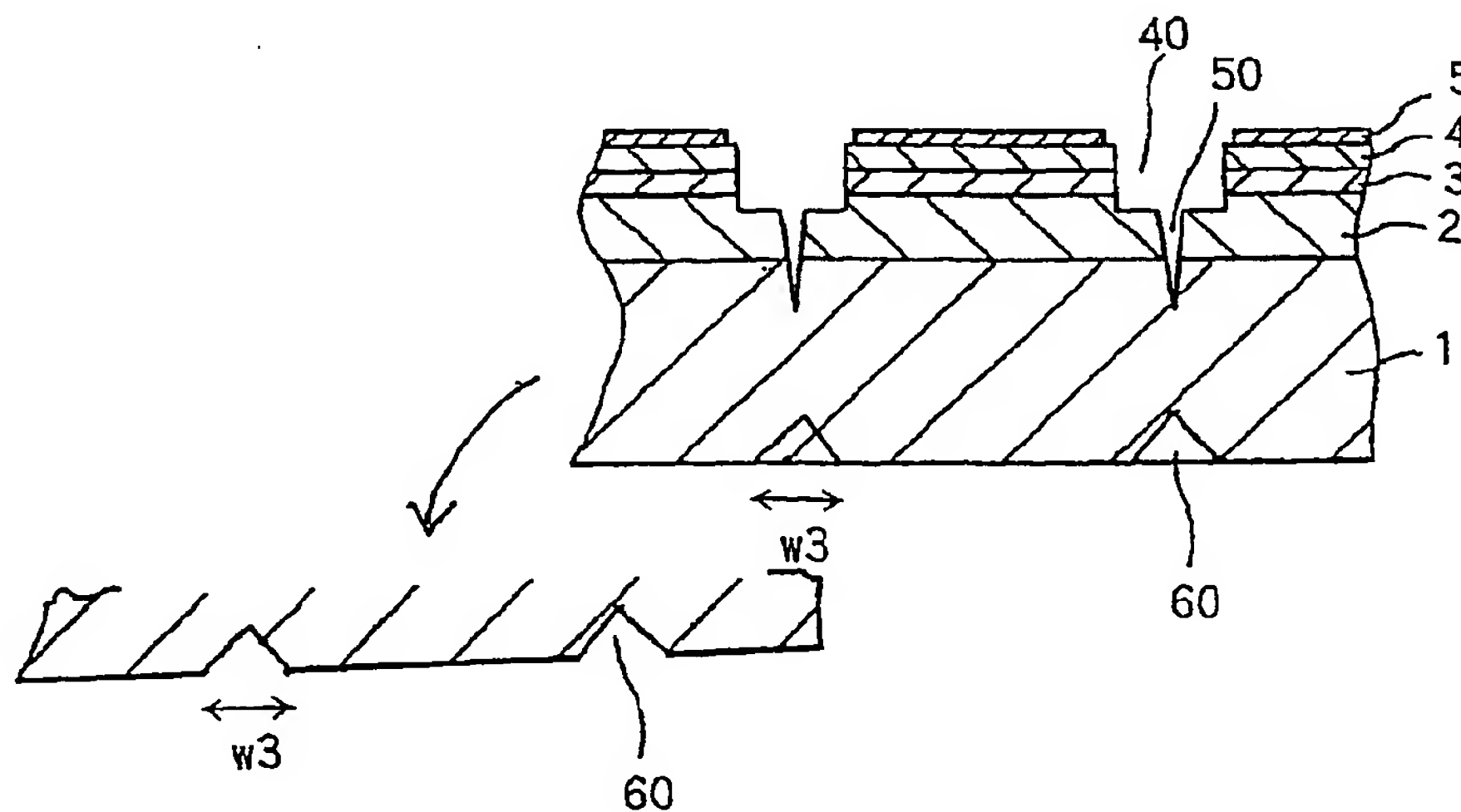
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR FABRICATION OF SEMICONDUCTOR LIGHT-EMITTING DEVICE AND THE DEVICE FABRICATED BY THE METHOD



(57) Abstract: A method for producing a semiconductor light-emitting device includes stacking at least a first conductive type semiconductor layer (2), an active layer (3) and a second conductive type semiconductor layer (4) on a substrate (1) to form a wafer, then forming on a side of growth surfaces of the semiconductor layers first trenches (40) exposing the first conductive type semiconductor layer, further forming second trenches (50) reaching the substrate from above the first trenches by using a laser beam, subsequently forming trenches (60) from the substrate at the positions corresponding to the second trenches, and finally cutting the wafer into chips. The produced semiconductor chips provide an enhanced efficiency of extracting emitted light even when the end faces thereof are smooth surfaces and they allow the semiconductor layer to be cut without distorting the end faces of the chips.

WO 2006/019180 A1